In a 78-year-old woman with chest pain and known Takayasu's arteritis, prospective, electrocardiographically triggered, 320-slice cardiac computed tomography revealed a network of arterial collateral arteries within the pericardium and mediastinum fed by the proximal right coronary artery (RCA) and proximal left circumflex coronary artery (LCX) (A to C, Online Videos 1 and 2). Because of Takayasu's arteritis, all 3 supra-aortal branches progressively narrowed over decades and finally occluded. Furthermore, stenosis of the right pulmonary artery with lobar occlusion to the right upper lobe (D), capacious intercostal arteries with rib erosions (E), and a dilated spinal artery (F) could be identified. Other causes of chest pain, including pulmonary embolism, aortic dissection, and obstructive atherosclerotic coronary artery disease, were successfully ruled out. The patient's symptoms suggest a coronary steal phenomenon. Redistribution of blood from the coronary arteries to the depicted network leaves dependent cardiac parenchyma at increased risk for undernourishment and myocardial infarction. LAD = left anterior descending coronary artery.